GOVERNMENT OF MADRAS

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EXTENSION WORKERS' GUIDE

FOR

INCREASING AGRICULTURAL PRODUCTION

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FOOD CROPS CAMPAIGN—1959

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DEPARTMENT OF AGRICULTURE
MADRAS STATE

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1959

KARIFF OR THE MAIN SEASON PRODUCTION CAMPAIGN, 1959.

Crops to be Included.—The campaign should be launched simultaneously in all the districts of the State. Special attention should be paid to principal crops of (1) Paddy, (2) Cholam, (3) Cumbu and (4) Ragi.

Formation of Campaign Committee.—The campaign will be organized at the following levels :—

(*a*) *State level* through the State Committee consisting of a Commissioner, Food Production, Director of Agriculture, Registrar of Co-operative Societies and State Secretary of the Farmers' Forum and members of the Food Production Committee.

(*b*) *District Level.*—Similar Committees at the District level consisting of Officers such as the District Collector, the District Agricultural Officer, Deputy Registrar of Co-operative Societies and Members of Legislative Assembly and Members of Parliament and progressive farmers.

Brigades will be formed at Block levels with the Block Development Officer wherever he is an Agrcultural graduate or the Agricultural Extension Officer as the Brigade leader and they will be given teams of helpers to assist them who will consist of students from Agricultural Colleges (Coimbatore and Chidambaram), Trainees in the Rural Extension Training Centres, Assistants in Research Stations and Gramasevaks in service in the Blocks. The District Agricultural Officer will assign all the available helpers to each Block according to necessity. Normally the helpers will be located round about his parent institution to eliminate movement over long distances and restrict payment of travelling allowance. The District Agricultural Officer will also brief the members of the Campaign brigade on the running of the campaign supplying them with available literature such as hand-books, calender of operations, leaflets, posters, etc., on improved methods of cultivation of food crops.

Programme for the campaign.—The campaign will be inaugurated by the Ministers of State in different districts on the Tamil New Years day (the 14th April 1959). The Collectors will inaugurate the campaign in important centres within their district. The Deputy Directors of Agriculture and the District Agricultural Officers will inaugurate the campaign in other centres. The District Agricultural Officer will be in over all charge of the running of the campaign in his district, and will be permitted to utilise the services of all Research Officers and Development Officers working within his jurisdiction.

Green Manuring.

To be attended to in January-February in Delta areas.--An intensive propaganda should be launched to sow as large an area as possible under green manure in paddy lands, Appendix III gives practical hints on growing green manure. In addition a systematic effort should be made to plant Gliricidia and Ipomea on field bunds. Sesbania should be raised in nursery and planted on the sides of field bunds at the time of transplanting of paddy. The ideal should be not only to reach self-sufficiency in the matter of green manure seeds but also to produce a sizeable exportable surplus to meet the requirements of other states.

Compost drive.

To be attended immediately.—In view of the serious shortage of chemical fertilizers, a sustained drive for the preparation and use of local compost should be undertaken. The following measures would stimulate this work :—

Extension agency in the villages should be geared up to ensure that compost pits are dug according to the specifications laid down, and properly filled and maintained by farmers.

The training of farmers in compost-making, sanctioned under a special scheme, should be speeded up and linked with the training of Gram Sahayaks on a mass scale.

Compost drive should form an important subject of discussion in the Gram Sahayak training camps.

Supplying of improved seeds.

To be attended to between February and April.—The Committees at the District and Block levels should mage immediate arrangement for their seed requirements and take steps to arrange maximum distribution from Village Seed Farms as the harvest is now in progress. For the balance of seeds required the quantity of seeds available in the State Seed Farms should be taken into account and if necessary additional seeds may be procured. Within the district proper distribution of seeds should be made, arranging necessary transfers from surplus areas to deficit pockets. Last minute seed procurement is inexpensive and uncertain. Targets fixed for saturating the area with improved seeds should be attained in the shortest possible time. Village Level Workers and Extension Officers should devote some time to persuade the farmers to exchange seeds at the harvest time and see that the seed exchange target of the Village Seed Farm programme is fully attained.

Seed treatment against diseases.

An effort should be made for large scale treatment of the seeds available with the farmers. Suitable seed treatment drums should

be supplied to every village and demonstrations arranged. The entire seed stocked in Government and Co-operative seed godowns should be treated. In the case of paddy, treatment of the seed with Ceresan or Agrosan G. N. at 2 tolas for 20 lb. of seed as a preventive against foot rot should be carried out on a large scale.

Timely and proper method of sowing.

Line sowing should be adopted on an extensive scale as weeding and use of interculture implements are rendered easy. Sowing the seeds behind the plough or spaced dibbling of seed or seedlings in the case of millets may be encouraged. Details of raising nursery and sowing and transplanting of paddy are given in Appendix II and those for millets are given in Appendix IV. Contour sowing of cholam and cumbu in contour bunded areas should be pursued vigourously.

Use of fertilizers.

To be done in May and June.—The requirements of fertilizers both nitrogenous and phosphatic should be assessed by the teams and stocking arrangements made for them so that they are made available to the ryots at the time of transplanting and subsequent stages. Dosages for application of the different fertilizers to different crops are given in Appendices II and IV.

Use of improved implements.

To be attended in June and July.—(A) Demonstration and popularization of improved implements given in Appendix V should be taken up on a large scale. Particular attention should be paid to the use of Burmese Settun rottary weeder for paddy.

(B) The demonstration implements should be checked sufficiently in advance to see that they are in working order.

Plant protection.

Action to be completed in June.—Particular attention should be given to plant protecton measures for the crops in the field. Some of the items to be attended to are stated below :—

(1) Plant protection equipment of the Department should be checked and repairs carried out to equipments which is not in working order. Additional equipment should be procured for a more intensive drive.

(2) Dispersal of the equipment right down to the villages so that the equipment is within easy reach of farmers should be assured. Storage of equipment at Block headquarters will not do.

(3) Stocks of insecticides should be checked and steps taken in advance for storing at suitable places in adequate quantities.

(4) Special attention should be given to detecting and controlling pests such as the swarming caterpillars, jassids, rice bugs, stem borers and gall fly, which make a periodical appearance in certain areas. In these areas, adequate stocks of insecticides should be stored with suitable equipment. Early detection is important for avoiding damage. It would be worthwhile in areas periodically affected by these pests to have control plots in each district so that the pests could be detected very early and mass action taken in the affected areas.

(5) The State Department of Agriculture work in close co-operation with the Central Plant Protection Units set up in the states which stores additional equipment, insecticides and pesticides.

Details of important pests and diseases for paddy and their control measures are given in Appendix VI.

Irrigation.

Action to be completed by June.—All the filter points should be kept in working condition, and as many new filter points as possible should be sunk.

Intercultural operations.

Action to be taken before flowering of crop.—A drive should be undertaken for the extensive use of Japanese rotary weeder for paddy.

Roguing.—In all village seed farms, the drive should be undertaken to rogue offtypes at flowering to maintain the purity of stock. The Village Level Workers should be given adequate training for this purpose.

Collection and storage of seeds.

The Village Level Workers and others associated with the drive should ensure that no mixing takes place at the time of harvesting, threshing and storage of seed. Arrangements should be made for the exchange of improved seeds amongst farmers before storage.

Double-cropping in irrigated areas.

An attempt should be made to introduce double and multiple-cropping in irrigated areas, and particularly in areas where the new projects have come up.

Result demonstrations.

The following demonstrations deserve special attention :—

Demonstrations on the recommended green manuring practices.

Line sowing *versus Broadcasting*—Appendix VII. (Some of the points that need to be remembered by those laying out this demonstration.)

JAPANESE METHOD OF PADDY CULTIVATION.

Details given in Appendix II should be scrupulously followed.

Agricultural credit.—Timely supply of credit for the purchase of seeds, fertilizers, agricultural implements, etc., should receive the highest priority during the campaign period.

Action to be completed by June.—Definite target dates before the sowing operations should be set for sanctioning or disposing of all pending loan applications. This should be at least three to four weeks before the sowing. Revenue authorities should give particular attention to the removal of bottle-necks in the checking of applications and distribution of funds.

The concession available to farmers by way of taccavi, the steps to be taken to secure the loan quickly and the obligation of the farmers to utilize the loan for the purpose for which it was applied for should be widely published, at least two months before sowing.

Further simplification of administrative procedures for the expeditious sanction of applications should receive attention from now on.

MASS MOBILIZATION OF FARMERS.

An effort should be made to secure farmers' participation in the campaign on a mass scale by utilizing the services of non-official organizations like the Bharat Sevak Samaj, Farmers' Forum, etc. Experience has shown that non-official agencies should be initiated more and more on self-help items of work which could be specified in advance so that their energies could be diverted into productive channels. Some of the items for which they could be utilized are indicated below.

To be done at the appropriate time for each operation.—(1) Treatment of seed against seed-borne diseases.

(2) Preparatory tillage.

(3) Preparation of compost on scientific lines and development of local manurial resources.

(4) Use of green manure by cultivators over as large an area as possible.

(5) Use of fertilizers, both nitrogenous and phosphatic.

(6) Propagation of the use of improved agricultural implements.

(7) Adoption of measures such as proper alignment of field channels, keeping channels and field boundaries clean, dividing fields into compartments in canal-irrigated areas before irrigation,

keeping old minor irrigation works under constant repair through community effort and using improved irrigation appliances by farmers.

(8) Mass mobilization of farmers for adoption of control measures during the outbreak of pests and diseases.

(9) Exchange of seed amongst farmers before storage.

Schedule of work for Village Level Workers.—For each month during the campaign period, a schedule of duties of Village Level Workers and other Extension staff in connection with the production drive should be prepared. It should be ensured that the programme is followed according to the schedule.

General.—The object of campaign is to achieve by every means more production than in the previous Khariff season. It aims at the fullest mobilization of all resources, agencies and organizations and their co-ordinated use for increasing the production of the Khariff crops. Its effectiveness would depend on the effieciency of supervision from the officers and the enthusiasm they could create among farmers, for improving their standard of cultivation and achieving higher production.

APPENDICES.

APPENDIX I.

MOST IMPORTANT STRAINS GROWN FOR THE KHARIFF PADDY CROP IN THE DIFFERENT DISTRICTS OF THE STATE.

Name of the district. (1)	*Important strains grown in the Khariff season.* *Sornavari, Kuruvai or Kar.* (2)	*Samba (single crop land).* (3)	*Pishanam or Thaladi.* (4)
1 Chingleput ..	CO 13, TKM 3, TKM 6.	GEB 24, CO 5, BAM 3, ADT 22, TKM 1, TKM 2.	....
2 North Arcot ..	ADT 3, ADT 9, CO 13.	GEB 24, MTU 19, CO 2, CO 5.	....
3 South Arcot ..	TKM 3, ADT 20, PLR 2, TKM 6.	GEB 24, BAM 3, MTU 19, CO 19.	....
4 Tanjore	ADT 3, ADT 20, ADT 9.	ADT 1, ADT 2, CO 19, CO 25.	ADT 8, ADT 25, CO 25.
5 Tiruchirappalli ..	ADT 3, ADT 20, ADT 19, CO 13.	GEB 24, CO 3, CO 7, CO 19, CO 25.	....
6 Salem	CO 13, TKM 6 ..	GEB 24, CO 3, CO 27, CO 2, ASD 5.	....
7 Coimbatore ..	CO 23, CO 10, CO 13, CO 18, TKM 6.	GEB 24, CO 3, CO 27, CO 2, CO 25.	....
8 Madurai	CO 13	GEB 24 ..	ASD 5, CO 19, CO 25.
9 Ramanathapuram.	....	ASD 4, ASD 1, CO 2, ASD 5, ASD 6.	....
10 Tirunelveli ..	ASD 1, ASD 3 ASD 8, ASD 9.	....	ASD 4, ASD 5, ASD 6, ASD 11, CO 12, CO 25.
11 Kanyakumari ..	ASD 1	....	CO 25, ASD 5. ADT 8.
12 Nilgiris	....	Maranellu, Kothandan, Chettuvaliyan, Palthondi, Marathondi.	....

APPENDIX II.

Hints on modified Japanese method of rice cultivation.

I. *Seed bed.*

1. Dry seed bed need not be insisted on unless it is in vogue in the particular tract.

2. The dry seed beds may be manured with cattle manure at the rate of 20 cartloads per acre.

3. Manure the wet seed bed with green leaf at 8 to 10 cartloads per acre or cattle manure at 15 to 20 cartloads per acre ten days before sowing.

4. Raised seed beds 3 inches above ground level and 4 or 5 feet wide with one foot channel between beds may be formed.

II. *Selection of seed.*

1. Select the suitable improved strain for your tract.

2. Short duration varieties may be put in salt solution and heavy seeds that sink selected for sowing, as seeds have given increased yields (half Madras measure of salt dissolved in one gallon of water is sufficient for treating 20 lb. of seed).

3. Dry the wet seed and treat with *Ceresan* or *Agrosan GN* at 2 tolas for 20 lb. of seed as a preventive against foot rot disease.

III. *Seed bed and sowing.*

1. Sow at the rate of 3 lb. of seed per cent in the nursery. The seed rate may be reduced slightly (2½ lb.) for the fine grained varieties and increased to (3½ lb.) in the case of coarse grains. Seven to ten cents of nursery will be sufficient for transplanting one acre.

2. The age of the seedlings up to which they can be retained in the seed bed is 20 to 25 days for short duration varieties and 30 to 40 days for medium and long duration varieties (i.e., at one week for every month of the duration of the crop).

3. The seed bed should be kept free of weeds and irrigated whenever necessary.

4. Top dress the seed bed, if necessary, at the rate of one pound of *ammonium sulphate* per cent for pushing up growth of seedlings a week or 10 days before pulling out the seedlings.

IV. *Transplant field.*

1. Manure the transplant field at 5,000 lb. of green leaf per acre (4 to 6 cartloads) or 10 to 15 cartloads of cattle manure or compost.

2. Apply *super phosphate* at 150 lb. per acre and 75 lb. of *ammonium sulphate* in plough furrows at the time of last ploughing.

V. *Transplanting.*

1. Plant in rows as it facilitates inter-cultivation by *rotary inter-cultivator.* Adopt a spacing of 10 inches between rows and along the row a spacking of 4 inches may be adopted in the case of short duration varieties using 4 to 5 seedlings per hole. In the case of medium and long duration varieties, plant 2 to 3 seedlings at 6 inches along the row.

VI. *After care.*

1. Top dress the transplant crop with *ammonium sulphate* at 75 lb. per acre one month after planting for short duration varieties and 45 to 60 days after planting for long and medium duration strains. In places where there is incidence of blast, the dose may be reduced.

2. *Ammonium sulphate* can be also applied as top dressing in one dose when not possible to apply in two doses.

3. Inter-cultivation with the *rotary inter-cultivator* every 15 days starting from 15th day after transplanting. This reduces the cost of weeding at least by Rs. 2 to Rs. 3 per acre. Stop the inter-cultivation two weeks before flowering.

4. Prompt action should be taken to control pests and diseases, if any.

5. *Harvest.*—Stop irrigation a week before harvest and the crop may be harvested in time and threshed on a clean threshing floor. The produce should be winnowed to remove all the dust, chaff and mud particles, etc., and stored after thorough drying.

APPENDIX III.

GREEN MANURE CROPS.

Sesbania speciosa can be sown in the standing crop of paddy before harvest. The crop does not make much progress during the summer months but grows luxuriantly after the receipt of water in channels. This method can be practised in Tanjore Delta and parts of Tiruchirappalli district. This will meet the major requirements of paddy.

Nurseries of sesbania speciesa can be raised a month in advance of the sowing of paddy crops. The seedlings so raised can be planted along the field bunds soon after transplanting of the paddy crop. The sesbania seedlings establish well, grow and supply the green manure for the second crop. This can be practised in all localities where a second crop is grown.

In loamy soils where facilities exist for a few irrigations sunnhemp (Crotalaria Juncea) can be grown 5 to 6 weeks of the planting of the crop. The seed rate adopted is 50 lb. per acre. This green manure can be grown where only a short period for the growth of green manure is available.

In sandy soil of the Tanjore Delta wild indigo (*Tephrosia purpurea*) can be sown at the rate of 30 lb. per acre before the harvest of the Samba paddy crop. This green manure crop will grow fairly well even under very restricted irrigation water. This has the additional advantage of establishing a self-sown crop when the sowing has been done in the same field for three consecutive years.

Daincha (*Sesbania aculeata*) can be sown 8 to 10 weeks ahead of the planting of paddy crop or in the standing crop of paddy before its harvest. The seed rate adopted is 40 lb. per acre. This green manure will come up even in saline lands where other green manures fail to grow.

Sunnhemp can be grown in-between rows of sugarcane in June–July. The green manure crop may be turned into soil during succeeding earthing up.

APPENDIX IV.

Cholam (rain-fed).

1. *Preparatory cultivation.*—Plough the land to fine tilth by giving two to three ploughings. Use light iron ploughs for efficient and economic ploughing. Pick out and remove weeds, stones, stubbles, etc., and keep the field clean.

2. *Manures and manuring.*—Apply five to ten cartloads of farmyard manure per acre and cover the manure soon after it is spread.

3. *Use improved strains.*—Improved strains yield 10 to 15 per cent higher yield than the unselected bulk. Select the strain that is suited to your tract.

Strain Co.1—Periamanjal cholam—Coimbatore district.

Co.10—Talavirichan cholam—Salem, North Arcot, South Arcot and Tiruchirappalli.

CPT.2—Talavirichan cholam—Salem and North Arcot.

K3—Periamanjal Irungu—Madurai, Ramanathapuram, Tirunelveli.

4. *Seeds and sowing.*—Select heavy seeds with good viability eliminating immature and ill-filled grains. Treat the seeds with *Agrosan GN* (one oz. of the chemical for 30 lb. of seed) before sowing. The seeds can be mixed with fungicide by putting them in a drum or some other vessel and rotating or stirring thoroughly. Sow the seeds in lines.

5. *Seed rate and spacing.*—For pure crops 10 to 12 inches of seed will be required per acre. Adopt a spacing of 9 inches spacing between plants and 15 to 16 inches between rows. Mixed cropping of cholam and lablab (Coimbatore district) or cholam and redgram (Salem, North Arcot), is more economic than raising pure crop of cholam. Sow 9 lb. of cholam and 3 lb. of lablab of redgram if grown mixed.

6. *After cultivation.*—Thin the crop when the seedlings are about 35 days old and give a thorough weeding and inter-cultivation. In line sown crops, bullock-drawn implements can be used for inter-cultivation. There is reduction in cost of cultivation if cattle-power is used instead of human labour. Give a second holing or inter-cultivation when plants are 60 days old. Remove diseased plants, offtypes and other unwanted plants as and when they are noticed.

7. *Production against pests and diseases.*—Take preventive measures against pests and diseases and control them in time. Calocoris (earhead bug) is a serious pest on cholam which appears at the time of flowering. Dust 5 per cent gammexane when the crop commences flowering. About 20 lb. of gammexane will be required for an acre, the total cost including labour for dusting will come Rs. 7 per acre. This expenditure is worth incurring as it saves the crop at the stage of grain development. Arrange for bird scaring when grains near maturity to prevent damage from bird attack.

8. *Seed selection and preservation.*—Select well developed earheads from plants true to the variety raised and dry them properly. Trash the earhead separately clean and preserve the seeds carefully in mud pots, bins or kerosene tins with preservatives like napthalene. If kept in gunny bags, dust 5 per cent gammexane on the bags to keep off insects.

Cumbu (rain-fed).

1. *Preparatory cultivation.*—Plough the land with light iron plough two to three times.

2. *Manures and manuring.*—Manure the field with 10 cartloads of cattle manure or compost and cover with junior hoe or country-plough.

3. *Use of improved strains.*—Use improved strains like Co.2, Co.4 or hybrids XI or K.3.

4. *Seeds and sowing.*—Adopt an economic seed rate of 6–8 lb. of good viable seeds per acre. Treat the seeds with *Agroson GN.* before sowing. Adopt a spacing of 1½–2 feet between rows and 9 inches between plants.

5. *After cultivation.*—Thin the crops three weeks after sowing and fill up the gaps if necessary. Give one hoeing after thinning.

6. *Selection of seed.*—Collect earheads from healthy plants which are true to type and have them threshed separately. Keep the cleaned seeds carefully preserved for future use.

Do not take seed material from a hybrid crop. Renew the hybrid seed every time from the department.

Ragi (Irrigated).

1. *Preparatory cultivation.*—Plough the field to fine tilth by giving 3 to 4 ploughings. Use light iron-plough for efficient and economic ploughing. The number of ploughings can be reduced if mould board ploughs are used for ploughing.

2. *Manures and manuring.*—Apply 20 cart-loads of cattle manure and cover the manure soon after it is spread on the field.

3. *Forming beds.*—Divide the field into beds and channels to facilitate irrigation. The bund former is an efficient implement for forming beds with the minimum human labour. With one pair of animals, four acres can be worked in a day. The usual size of bed is 10 to 12 feet.

4. *Preparation of nursery.*—Prepare the nursery areas to a very fine tilth either by ploughing or by digging. Incorporate finely powdered cattle manure at the rate of 20 cart-loads per acre. Divide the nursery into long narrow beds with suitable irrigation channels. Sow three pounds of seeds in three cents of land and let it water soon after sowing. Irrigate seed-beds once in four days.

5. *Use improved strains.*—Improved strains of ragi yield about 15 per cent more than the local varieties. Select the strain that is suited to the tract. The following are improved strains suited to your tract:—

Coimbatore	Co1, Co2, Co7 and K2.
Salem	Co1, Co2, Co7.
Tiruchirappalli	Co2.
Madurai	Co1, Co2, Co5.
Tirunelveli	K1, K2.
Ramanathapuram	K1, K2.
North Arcot	Co1, Co2.
South Arcot	Plr1, Akp1.
Chingleput	Akp1, Plr1, Co1, Co2.

6. *Transplanting.*—Pull out seedlings for planting 20 days after sowing in the case of short duration varieties like Co7, Akp1, etc. For medium duration varieties the seedlings are to be pulled 25 to 30 days after sowing. Long duration varieties can be kept in the nurseries up to 35 days. Plant seedlings in beds 6 inches row to row and plant to plant. Dip roots of seedlings before planting in crude oil solution to keep off root aphids.

7. *After cultivation and irrigation.*—Ragi requires the maximum quantity of water among millets. Give one soaking irrigation to secure a puddled condition at the time of planting. Within four to five days after planting, give a second irrigation. Give third irrigation a week later. Allow the fields to dry up for about 15 to 20 days to suppress the growth of weeds and induce deep roots. Give one holing and weeding a month after planting. Irrigate at intervals of 10 days. Cut off irrigation when the grains are mature.

8. *Harvest and preservation of seeds.*—Collect earheads from plants true to the varieties and have them separately threshed and cleaned. Preserve seeds in bins or tins using napthalene as a preservative. If seeds are stored in gunny bags dust outer surface of bags with 5 per cent gammexene.

Ragi (Rain-fed).

1. Plough the land to fine tilth.
2. Manure the field with 10 cartloads of farm.
3. Sow strain Co1 in lines using 10 to 15 lb. seed rate.

4. Thin the crop when the crop is 3 weeks old, leaving 9 inches spacing between plants.

5. Intercultivate a month after sowing.

6. Use bullock-drawn implements for inter-cultivation.

7. Select earheads of plants true to the variety and have them threshed and cleaned. Keep the seeds carefully preserved using napthalene as a preservative.

APPENDIX V.

Agricultural Implements.

'A' Tillage implements.

(1) Implements, (2) For what purpose used and where, (3) Crop for which used.

I. 1. Research Engineer's Improved Fire Fly Plough.
   2. It is a very light plough operated by one man in places where bullocks cannot be used as for example in hilly slopes (cost Rs. 20).
   3. Dry crops, millets.

II. 1. Turn-wrest plough.
   2. The mould board can be reversed to give inversion any side (cost Rs. 35).
   3. Dry garden lands, ragi and vegetables.

III. 1. Ridge plough.
   2. This is useful for forming 'V' shaped ridges covers 2 to 3 acres per day (cost Rs. 40).
   3. Garden cultivation, sugarcane, ragi.

IV. 1. Adjustable ridge plough.
   2. This is a double mould board plough which can be used for forming ridges 16 inches to 26 inches wide covers 3 to 4 acres per day (approximate cost Rs. 65).
   3. Garden cultivation, sugarcane, ragi.

V. 1. Cultivator (5 tyned).
   2. This is useful for general cultivation as well as inter-cultivation between row crops.
   3. Millets.

VI. 1. Triangular harrow.
   2. It is used after ploughing to break down the clods and to give the soil fine tilth for the preparation of seed bed, for covering seeds, for inter-cultivation of crops, for stirring and serating soils destroying small weeds and for breaking up top crust and maintaining surface mulch (cost Rs. 40).
   3. Line sown crops, dry crops.

VII. 1. Guntaka.

2. It is a blade harrow used for creating mulch, covering seeds, breaking clods and for harvesting groundnuts (cost Rs. 40).

3. Line sown crops, dry crops.

VIII. 1. Bund Former.

2. This is an implement very widely used for forming bunds. It can be had in three sizes with blades 2 feet 6 inches, 3 feet 6 inches and 5 feet long. This can be operated by one man and a pair of animals (cost Rs. 35).

3. Dry land cultivation. Ragi, other garden crops, etc.

IX. 1. Buckscraper.

2. This is used for scooping out earth and cleaning drains and moving earth and manure over short distances. This is available in two sizes of 2 cubic feet with and without teeth. On level lands it can transport about 300 cubic feet of earth per day over short distance (cost Rs. 40).

3. For preparation of lands before cultivation, levelling and reclamation.

X. 1. Green manure trampler.

2. Useful for incorporating green manure—covers about 3 acres per day (cost Rs. 60).

3. Puddled field.

XI. 1. Wet land puddler.

2. It is used for puddling in paddy fields. Also can be used for trampling green manures. This covers 2 to 3 acres per day (cost Rs. 70).

3. Wet lands, paddy.

XII. 1. (Improved) Burmese Sectun (Helical bladed).

2. This is an implement , useful for trampling green manure and puddling. This implement can be drawn by a pair of small bullocks. With the help of this implement an area of 2½ to 3 acres can be effectively transplanted.

3. Paddy.

XIII. 1. Handrake (Japanese type).

2. Used for intercultivating and weeding in the paddy fields under Japanese methods.

3. Paddy fields.

XIV. 1. Junior Hoe.

2. It is similar to the five tyned cultivator. This can be expanded to the desired width. It is used for intercultivation purposes.

XV. ' *B* ' *Sowing and planting.*

I. 1. Research Engineer's mechanical seed drill.

2. It is used for sowing seeds in rows evenly spaced at regular intervals. It is available in two sizes (4 tyned and 6 tyned). The 4 tyned covers 2 to 3 acres and 6 tyned covers 3 to 4 acres per day (cost Rs. 300 and Rs. 400).

3. Groundnut, cholam and other large sized seeds of dry crops.

II. 1. Transplanter.

2. This implement can be used for transplanting nursery plants without injuring the roots. Two 'U' shaped discs are so arranged that while operating they take nursery plants from the nursery bed without injuring the roots (cost Rs. 20).

'C' Inter-cultivation, weeding and irrigation implements.

I. 1. Rotary weeder with or without fertilizer attachment.

2. It is used for inter-cultivation between rows of paddy plants in paddy field sown under Japanese method of cultivation. It stirs up the soil, creates mulch, uproots weeds and buries them; can also be fitted with fertilizer attachment which enables the weeding and application of fertilizers to be carried out in one operation.

II. 1. Country mhote (Rool easy).

2. This simple animal-drawn implement which is commonly used for baling out water from a well by an ordinary ryot having small holdings. The output is 1,200 to 1,800 gallons depending on the depth of water-level (cost Rs. 15 to Rs. 35).

3. General purpose—Irrigation.

III. 1. South Arcot type circular mhote.

2. A very efficient baling device suitable for lifting water from a depth not exceeding 14 feet. The output is 4,800 gallons per hour.

3. Irrigation.

IV. 1. Research Engineer's Bullock Pump.

2. This is worked like a country mhote in an open well. This can also be fixed to the filter point tube-well and bore-well. This will be very useful for a poor ryot who cannot afford to purchase electric motor or oil engine pumpset.

3. Irrigation.

'D' Harvesting, threshing and other grain processing implements.

I. 1. Seed treating drum.

2. This is used for treating the seeds with fungicides (cost Rs. 25).

II. 1. Decorticator groundnut, pedal operated.

2. This is a pedal-operated decorticator with winnowing attachment. The output of this machine is 85 lb. per hour and breakages only 2 per cent (cost Rs. 175).

'E' Other implements.

I. 1. Contour marker.

2. This implement is designed to be operated by a lay man for marking contours in hills and plains. It will reduce the cost of establishment and instruments for the execution of soil conservation schemes in States. Cost Rs. 75.

II. 1. Sack-holder.

2. With this contrivance, a single man can easily fill in the agricultural produce into the bags and there is no necessity for a second man to hold the bag with its mouth open. Hence there is saving in labour of one man.

III. 1. Turmeric Polisher.

2. For polishing boiled and dried turmeric-polishers about one ton of polished turmeric per day of eight hours (cost Rs. 200).

IV. 1. Chaff cutter.

2. This is a very useful implement to every agriculturists and simple in mechanism; wastage of fodder is reduced to a great extent and thus economy in the farm is assured. Fodder could be cut for 5 to 6 heads of cattle per hour (cost Rs. 40).

V. 1. Stalk puller.

2. This is used for pulling out cotton stalks very easily and economically (cost Rs. 10).

APPENDIX VI.

PESTS AND DISEASES—(*A*) *Pests.*

Name of Pest. (1)	*Control measures.* (2)
Stem borer—*Schoenobius Incertellus*	Collection of egg masses. Light traps for collection of moths. Spraying Folidol 1 oz., in 12½ gallons of water or Endrin 1 oz., in 12½ gallons once in the nursery, once a fortnight after transplanting and once a fortnight before flowering.
Rice bug—*Leptocories acuts*	Applying BHC 10 per cent dust.
Mealy bub—*Rispesia cryzae*	Spraying Folidol 1 oz., in 6¼ gallons of water.
Gall fly—*Pachydiplosis oryzae.*	Spraying Folidol or dusting BHC 10 per cent dust.
Caseworm—*Nymphula depuncta list.*	Dusting BHC 10 per cent dust.
Grasshopper—*Hieroglyphus banean and Oxya velox.*	Do.
Spotted rice Jassids—*Nephotettix bipunctatus.*	Dusting DDT 5 per cent dust or spraying DDT 0·1 per cent.
Fulgorid—*Nilaparyata Sordescens.*	Dusting BHC 10 per cent dust.
Rice hispa—*Hispa armigera*	Do.
Thrips	Do.

(*B*) *Diseases.*

Name of disease. (1)	*Control measures.* (2)
Blast—*Piricularia Oryzae*	Grow resistant varieties.
Foot rot—*Fusarium Moniliforme* ..	Treat seed with Agrosan GN or Ceresan.
Helminthosporiose — *Helmiathosporium oryzae.*	Do.
Stem rot—*Sclerotium oryzae*	Drain water and pull out affected plants.
Root rot—*Pythium*	Drench with 1 per cent Bordeaux mixture.
False smut—*Ustilaginoidea virens* ..	Not serious.
Godhu bathi—*Ephelis oryzae*	Not serious.

APPENDIX VII.

Points to remember while conducting result Demonstration.

Some hints to Village Level workers.

1. People in the village are like people anywhere else. They follow the traditional ways handed down from the past because they know what results can be expected from these. They do not know what results are possible from other methods. The farmer operates on such a small margin that he cannot afford to take the risk of getting lower crop-yields.

2. You, on the other hand, are concerned about how to change the villagers' traditional ways of thinking and doing things. You must, therefore, be very careful in guiding the villager in making changes so that his experience is satisfactory. Satisfaction with results from one change leads persons to try still others. You will be wise to place high faith in the result demonstration as a method of gaining village acceptance.

3. You should try in your demonstrations only approved recommendations. If technical recommendations are to succeed, it is important that they are carried out correctly in detail and in appropriate sequence.

4. To assure maximum village acceptance, each recommended demonstration should, as far as possible, be tried out first on the farm of each leader or progressive farmer in the village.

5. Be sure that the new practice to be demonstrated is one which the majority of the villager can actually adopt if the demonstration is successful.

6. Be certain that there is at least a nucleus of villagers interested in the problem which the demonstration is to assist in solving.

7. Be sure that you are yourself well enough informed to guide the demonstration through all the steps considered essential for a successful demonstration.

8. Be sure that the cultivators selected are prepared to carry on the demonstration on their own land.

9. Be sure that the Block staff follow through on each step where staff assistance is required.

10. Arrange to get cultivator-demonstrator to select plot of land on which he will continue to follow his regular methods, and a second one of the same size and soil quality on which he will follow in detail the new practice to be tested. Remember, the result demonstration must test the new beside the old, and provide for comparing the results.

11. The plot selected for the demonstration should be accessible to many people and passers-by.

12. If a crop is involved in a demonstration, be sure that groups of cultivators visit the demonstration on at least three occasions; first when the demonstration is being started, second at mid-point in growth, and third at the end of harvest time. You should plan to be present on each of these three occasions to help the observers understand that demonstration and evaluate the results.

13. If you are to use the results of a demonstration in the educational programme to promote widespread adoption of the new practice, you should have at least a specified number of comparable demonstrations in each village. You should keep precise records so that the demonstration will be known. Photographic records of results from the demonstrations will be extremely useful for work in other villages.

14. The result demonstration is almost a fool-proof approach when its objectives are understood and all the steps carried out carefully.

YEAR CALENDAR

January.

Madras Division.—Sowing Cowpea and greengram in wetland preparing land for Navarai and raising nursery; harvest of millets.

Coimbatore Division.—Harvest of early Samba; planting Navarai; harvest of millets and pulses; planting and weeding irrigated ragi; planting irrigated potato; preparing land and planting English vegetables.

Tanjore Division.—Sowing green manure seeds and harvest of Samba; preparing nursery for Navarai; sowing blackgram; collection of Sesbania seeds; harvest of redgram and varagu.

Madurai Division.—Planting Navarai; harvest of cholam and pulses; sowing ragi; preparing land for Navarai.

February.

Madras Division.—Planting and weeding and applying ammonium sulphate to Navarai paddy; sowing green manure seeds; harvest of samba and sowing blackgram; preparing land for cholam sowing ragi; weeding cumbu.

Coimbatore Division.—Harvest of Samba begins; planting of Navarai closed; harvest of pulses; weeding and applying ammonium sulphate to Navarai crop; planting potato, preparing land for Kar crop of potato and samai (Nilgiris district); preparing land for cholam; sowing cumbu and ragi; harvest of varagu, redgram and field beans.

Tanjore Division.—Planting Navarai; sowing green manure seeds; harvest of thaladi; harvest of redgram and varagu; collection of Sesbania seeds from border planted crop; sowing cumbu; preparing land for cholam.

Madurai Division.—Applying ammonium sulphate to Navarai; sowing blackgram and green manure seed after harvest of paddy; harvest of second crop of paddy; harvest of millets.

March.

Madras Division.—Harvest of greengram; harvest of Samba paddy; weeding Navarai; harvest of Thaladi; preparing land for Kar; weeding of ragi; harvest of early ragi.

Coimbatore Division.—Harvest of late Samba; weeding and fertilizing Navarai; preparing land for irrigated millets; planting Kar crop of potato; sowing and weeding ragi and cumbu; sowing cholam.

Tanjore Division.—Planting Navarai; harvest of redgram and blackgram; sowing cholam; weeding of cumbu (TRI).

Madurai Division.—Harvest of Pisanam; sowing blackgram and greengram; harvest of cumbu.

April.

Madras Division.—Harvest of Navarai paddy; collection of green manure seeds; harvest of blackgram and greengram; preparing land for Kar paddy; harvest of cholam and cumbu; sowing ragi.

Coimbatore Division.—Collection of green manure seeds; preparing land for paddy (Kar); preparing land sowing irrigated cholam; harvest of ragi.

Tanjore Division.—Collection of green manure seeds; harvest of blackgram; preparing Kuruvai nursery; sowing cholam.

Madurai Division.—Collection of green manure seeds; harvest of cholam, sowing of ragi and greengram in wet land areas.

May.

Madras Division.—Preparing nursery and field for Sornavari; harvest of blackgram and Navarai paddy; preparing land for cumbu.

Coimbatore Division.—Harvest of Navarai paddy; preparing Kuruvai nursery; preparing land for rainfed millets.

Tanjore Division.—Raising early Kuruvai nursery where irrigation facilities exist; raising Sesbania nursery; sowing irrigated ragi.

Madurai Division.—Raising Kar nursery where irrigation facilities exist; sowing blackgram in dry lands; harvest of cholam; sowing ragi.

June.

Madras Division.—Planting, weeding and applying ammonium sulphate for Sornavari; planting Kar and early samba paddy; preparing land and sowing nursery for late samba; weeding and thinning cumbu.

Coimbatore Division.—Planting Kar and early samba; sowing main season potato and earthing up Kar crop of potato; sowing millets; harvest of irrigated cholam; ragi and tenai; harvest of cholam.

Tanjore Division.—Planting kuruvai; preparing Samba nursery; preparing land for cholam and cumbu and redgram in dry lands.

Madurai Division.—Planting paddy; preparing land for sowing millets; sowing redgram and field beans; harvest of irrigated cholam and ragi.

July.

Madras Division.—Planting of Kar paddy; sowing millets mixed with pulses in lines in dry lands; harvest of irrigated ragi and cholam.

Coimbatore Division.—Planting samba paddy; harvest of potato; sowing and weeding millets in dry lands; harvest of irrigated cholam.

Tanjore Division.—Weeding Kuruvai crop; preparing nursery and land for samba and planting early samba; sowing millets and pulses; harvest of irrigated cholam.

Madurai Division.—Weeding and fertilizing Kar paddy; harvest of blackgram and greengram; sowing samba; sowing millets and pulses in black soils; harvest of irrigated cholam and ragi.

August.

Madras Division.—Harvest of sornavari; raising nursery for samba; preparing land and sowing semi-dry paddy; weeding, roguing and applying ammonium sulphate to Kar crop and early sown samba; sowing millets mixed with pulses in dry lands; harvest of irrigated cumbu and ragi.

Coimbatore Division.—Weeding and fertilizing Kar and early sown samba; planting of late samba; planting potato; sowing millets with pulses in dry lands; harvest of irrigated cumbu.

Tanjore Division.—Weeding samba; preparing thaladi nursery; sowing millets and redgram; harvest of irrigated cholam.

Madurai Division.—Fertilizing earpaddy; sowing millets and pulses in dry lands; harvest of irrigated ragi.

September.

Madras Division.—Harvest of sornavari; preparing land for Samba nursery; harvest of Kar paddy; sowing and weeding millets and pulses in dry lands; harvest of irrigated ragi.

Coimbatore Division.—Weeding and inter-cultivating late samba; harvest of Kar crop and planting late crop of potato; harvest of cumbu; weeding and thinning cumbu.

Tanjore Division.—Harvest of kuruvai paddy; planting, weeding and fertilizing samba paddy; preparing land for Thaladi using Sesbania grown on borders of Kuruvai paddy fields; harvest of irrigated ragi.

Madurai Division.—Raising nursery for Pisanam; harvest of first crop of paddy.

October.

Madras Division.—Harvesting Kar crop begins; preparing land for Thaladi; sowing blackgram, horsegram and samai in dry lands; harvesting of irrigated ragi; sowing of irrigated cumbu.

Coimbatore Division.—Harvesting Kar crop; weeding and fertilizing samba paddy; earthing up of third crop potato; sowing wheat; harvesting ragi.

Tanjore Division.—Harvest of Kuruvai; planting Thaladi; harvest of ragi; weeding and inter-cultivating cumbu, varagu, samai and tenai; hervest of irrigated cumbu.

Madurai Division.—Planting Pisanam; sowing greengram; sowing cholam; sowing and weeding millets and pulses.

November.

Madras Division.—Land preparation and preparation for late samba; harvest of Kar continues; fertilizing samba; harvest of ragi, samai and cowpea; sowing of blackgram; sowing irrigated cholam.

Coimbatore Division.—Kar paddy harvest; weeding and inter-cultivating samba paddy; earthing third crop of potato; weeding wheat; harvest of ragi.

Tanjore Division.—Weeding, inter-cultivating and fertilizing thaladi; weeding varagu and samai; harvest of ragi and pulses; harvest of cumbu.

Madurai Division.—Weeding, inter-cultivating and fertilizing Pisanam; harvest of millets; weeding, inter-cultivating and thinning irrigated cholam.

December.

Madras Division.—Sowing greengram and blackgram after harvest of early samba paddy; raising nursery for Navarai paddy; harvest of cholam and other millets and pulses in dry lands.

Coimbatore Division.—Harvest of early samba; preparing nursery for Navarai paddy; harvest of millets and pulses in dry lands; harvest of last crop of potato.

Tanjore Division.—Harvest of early samba paddy; sowing blackgram and greengram in wet land; harvest of millets in dry lands.

Madurai Division.—Harvest of samba paddy; raising nursery for Navarai paddy; harvest of millets and pulses in dry lands; weeding, inter-cultivating and roguing ragi; harvest of ragi in dry lands.